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Datasheet for the decision of 23 October 2015

Case Number: T 1986/11 - 3.2.06

Application Number: 02759633.7

Publication Number: 1427921

IPC: F01P1/04, F02F3/22, F02F3/00

Language of the proceedings: EN

Title of invention:
CLOSED GALLERY PISTON HAVING REINFORCED OIL HOLE

Patent Proprietor:
FEDERAL-MOGUL CORPORATION

Opponent:
KS Kolbenschmidt GmbH

Headword:

Relevant legal provisions:
EPC 1973 Art. 56

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:

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Case Number: T 1986/11 - 3.2.06

D E C I S I O N
of Technical Board of Appeal 3.2.06
of 23 October 2015

Appellant: (Opponent)	KS Kolbenschmidt GmbH Karl-Schmidt-Strasse 74172 Neckarsulm (DE)
Representative:	Greif, Thomas Thul Patentanwaltsgesellschaft mbH Rheinmetall Platz 1 40476 Düsseldorf (DE)
Respondent: (Patent Proprietor)	FEDERAL-MOGUL CORPORATION 26555 N.W.Highway Southfield Michigan 48034 (US)
Representative:	Mehler Achler Patentanwälte Bahnhofstraße 67 65185 Wiesbaden (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 4 August 2011 concerning maintenance of the European Patent No. 1427921 in amended form.**

Composition of the Board:

Chairman M. Harrison
Members: M. Hannam
E. Kossonakou

Summary of Facts and Submissions

I. An appeal was filed by the appellant (opponent) against the interlocutory decision of the opposition division in which it found that European patent No. 1427921 in an amended form met the requirements of the EPC.

II. The appellant requested that the decision be set aside and that the patent be revoked.

III. The respondent (proprietor) requested that the appeal be dismissed.

IV. The following documents are relevant to this decision:

D1 US-A-5 595 145
D2 US-A-6 032 619

V. The Board issued a summons to oral proceedings and subsequently a communication containing its provisional opinion, in which it indicated *inter alia* that the subject-matter of claims 1 and 6 appeared to involve an inventive step over D1 in combination with D2 or with the common general knowledge of the skilled person.

VI. With letter of 10 September 2015 the appellant withdrew its request for oral proceedings and stated that it would not attend the scheduled oral proceedings.

VII. With communication dated 8 October 2015 the scheduled oral proceedings were cancelled.

VIII. Claim 1 of the sole request reads as follows:

"A closed gallery piston (10) for diesel engines, comprising:

- a piston body (12) having a top wall (14), an outer wall (24) formed with ring grooves (28), an inner wall (32) spaced radially inwardly from said outer wall (24), and a bottom wall (36) interconnecting said outer wall (24) and said inner wall (32), said walls providing an enclosed annular gallery (42) within said piston body (12) for cooling oil;
- pin boss portions (44) having aligned pin bores (58);
- at least one oil hole (80) in said bottom wall (36); and
- an oil hole boss (82)
characterized in that
- said oil hole boss (82) is defined by a locally thickened portion of said bottom wall (36) surrounding said at least one oil hole (80) and extending above an upper floor surface (38) of said bottom wall (36) into said annular gallery (42), wherein said oil hole boss (82) is non-circular in plan view including generally triangular lobe portions (84) connected to said outer wall (24)."

Claim 6 reads as follows:

"A method of making a closed gallery piston (10) for diesel engines, comprising:
- fabricating a piston body (12) having an enclosed gallery (42) for cooling oil defined in part by an outer wall (24) formed with ring grooves (28), an inner wall (32) spaced radially inwardly from the outer wall (24) and a bottom wall (36) interconnecting the outer and inner walls (24, 32), and including pin bosses (44) with aligned pin bores (58);
- forming at least one oil hole (80) in the bottom wall (36);
characterized by
- forming at least one locally thickened portion of the

bottom wall (36) to provide at least one associate oil hole boss (82) which surrounds the at least one oil hole (80) and extends above an upper floor surface (38) of said bottom wall (36) into said annular gallery (42), wherein said oil hole boss (82) is non-circular in plan view including generally triangular lobe portions (84) connected to said outer wall (24)."

IX. The appellant's arguments may be summarised as follows:

The subject-matter of claim 1 lacked an inventive step (Article 56 EPC). Starting from D1, the technical problem could be seen as improving the mechanical strength of the piston. The skilled person would see the thickening 25 of the bottom wall surrounding the oil hole 23 as a hint to provide further strengthening around the oil hole without involving an inventive step.

Alternatively, starting from D1 and combining this with the teaching of D2, particularly that boss 73 was disclosed as surrounding inlet passageway 88, would guide the skilled person to the oil hole boss of claim 1.

With respect to the subject-matter of claim 6, the same arguments applied regarding a lack of inventive step to those presented against claim 1.

X. The respondent's arguments may be summarised as follows:

The subject-matter of claim 1 involved an inventive step (Article 56 EPC). Starting from D1 and wishing to solve the objective problem of providing a piston with structural integrity even in the region of the oil

hole, the skilled person would find no hint leading him to the claimed solution. D1 itself included oil outlet holes (24a, 24b) with no strengthening at all such that it could not be considered to provide a hint leading the skilled person to the claimed subject-matter. Starting from D1 and combining this with the teaching of D2 changed nothing in this respect since the only boss 73 disclosed in D2 was remote from the oil gallery and so could not provide a teaching to strengthen the bottom wall of the gallery in the region surrounding the oil hole. A combination with the funnel shaped inlet 23 of D1 would also be problematic.

Reasons for the Decision

1. Inventive Step (Article 56 EPC)

1.1 The subject-matter of claim 1 involves an inventive step.

1.2 D1 and the skilled person

1.2.1 D1, as also accepted by both parties, represents the most promising starting point for considering inventive step of the subject-matter of claim 1. D1 discloses the following features of claim 1 (the references in parentheses being to D1):
- a closed gallery piston (10) for diesel engines, comprising:
- a piston body (3; see Fig. 1) having a top wall, an outer wall (13) formed with ring grooves (Fig. 1), an inner wall spaced radially inwardly from said outer wall (13), and a bottom wall (4) interconnecting said outer wall (13) and said inner wall (see Fig. 1), said

walls providing an enclosed annular gallery (2) within said piston body for cooling oil;
- pin boss portions (see Fig. 1) having aligned pin bores (implicit);
- at least one oil hole (23) in said bottom wall (4); and
- an oil hole boss (25; see Fig. 4)
- said oil hole boss (25) is defined by a locally thickened portion of said bottom wall (see Fig. 4).

The subject-matter of claim 1 thus differs from D1 in that:
a) the oil hole boss extends above an upper floor surface of the bottom wall; and
b) the oil hole boss has triangular lobe portions connected to the outer wall.

1.2.2 As regards the objective problem to be solved, the triangular shape of the lobe portions is not seen *per se* to be of technical relevance for the function of the oil hole boss. Paragraph [0024] of the patent states that the 'size and shape of the oil hole bosses will be governed ... by the structure needed to counteract the stress concentration', yet it is not evident why triangular lobe portions should be more effective in counteracting stress concentration than any other possible shape, provided this fits within the physical space constraints surrounding the oil hole. The triangular lobe portions are thus found merely to solve a problem of providing a suitable alternative shape, with no particular technical advantage compared to any other shape of boss. In this regard, it cannot be concluded that weight will necessarily be saved compared to an annular boss, since this depends on the structure of the lobe portions. The provision of an alternative shape is however obvious in the present

circumstances and is not seen by itself as a feature which in combination with the other features of claim 1 as contributing to the presence of an inventive step.

Thus based on the remaining differentiating feature a), the objective technical problem being addressed may be seen as the provision of a structurally stronger closed gallery piston floor.

1.2.3 There is no hint in D1 to guide the skilled person to modify the oil hole of D1 to incorporate a boss extending from an upper floor surface of the bottom wall (and having triangular lobe portions connected to the outer wall). Whilst it can be accepted that the skilled person understands the weakening effect of an oil hole in a structure and that a boss surrounding such a hole will strengthen the structure once more, no suggestion is to be found in D1 guiding the skilled person to the particular way in which this strengthening is achieved in claim 1, particularly the provision of a boss extending from an upper floor surface of the bottom wall.

1.2.4 The appellant's argument that the thickening 25 of the bottom wall surrounding the oil hole 23 in D1 guides the skilled person to further strengthening in this area according to claim 1, is not accepted. The 'thickening 25' referred to by the appellant is described in D1 as an annular funnel wall forming the inlet portion of the passageway 23 (see col.4, lines 60 to 63) which has the effect to 'efficiently funnel the spray of cooling liquid into the cooling cavity' (col. 6, lines 2 to 3). The 'thickening 25' is thus explicitly linked solely to funneling of the cooling liquid with no indication of intended or resultant strengthening of the lower transverse wall 4 in the

region of the oil hole 23. For the appellant's alleged advantage of strengthening there is simply no disclosure. Even if the skilled person, particularly through viewing Fig. 4, were to see a strengthening through thickening 25 of the region surrounding the oil hole, this fails to guide the skilled person to provide additional strengthening in the form of a boss extending above an upper floor surface of the bottom wall. If at all, the skilled person would be guided to provide a thicker boss on the side of the bottom wall already thickened (25; see Fig. 4) rather than on the inside of the gallery.

It is furthermore noted that the cooling liquid outlets (24a, 24b) depicted in Fig. 5 show no boss portion even on the lower surface of the bottom wall of the annular gallery; a hint to provide strengthening of the bottom wall surrounding an oil hole can thus also not be considered an obvious teaching of D1.

1.2.5 The subject-matter of claim 1 thus involves an inventive step (Article 56 EPC) when starting from D1 and combining this with the common general knowledge of the skilled person.

1.3 D1 together with the teaching of D2

1.3.1 As identified in point 1.2.1 above, the subject-matter of claim 1 differs from D1 in that:
a) the oil hole boss extends above an upper floor surface of the bottom wall; and
b) the oil hole boss has triangular lobe portions connected to the outer wall.

1.3.2 As further identified in point 1.2.2, the objective technical problem being solved by the skilled person

when starting from D1 and trying to reach the claimed subject-matter may be seen as the provision of a structurally stronger closed gallery piston floor.

1.3.3 D2 discloses a piston body (20) with an enclosed annular gallery (44). An oil hole (84) entering the bottom wall of the gallery (44) is depicted in Figs. 1, 3 and 4. This oil hole connects to an extended oil inlet passageway (80, 74, 88) which ends adjacent the pin boss portion (62) of the piston. D2 however fails to disclose a thickening of the gallery bottom wall anywhere in the vicinity of the oil hole, which could be regarded as structural strengthening of this weakened portion of the gallery bottom wall. This can be seen from Figs. 1, 3 and 4 which each depict the region where the oil hole enters the enclosed gallery, yet without indicating any strengthening of the gallery bottom wall at this position. Indeed this is not altogether surprising, given that the teaching of D2 is directed primarily to reducing the weight of a piston while still allowing a cooling inlet passage to be formed (see col.2, lines 39 to 47). It thus follows that, starting from D1 and faced with the objective technical problem, the skilled person would find no motivation in D2 to suggest modifying the piston known from D1 in such a way as to reach the subject-matter of claim 1 without exercising an inventive step (Article 56 EPC).

1.3.4 The appellant's argument, that a boss 73 is disclosed as surrounding inlet passageway 88 in D2 which would guide the skilled person to the claimed oil hole boss, is not convincing. As also noted by the respondent, this boss 73 is located remote from the bottom wall of the annular oil gallery and thus provides no hint to the strengthening of the bottom wall of the oil

gallery, let alone, as claimed, the upper floor surface of the bottom wall.

1.3.5 It thus follows that, starting from D1 and faced with the objective technical problem, a combination with the teaching of D2 does not lead the skilled person to the subject-matter of claim 1 without the exercise of an inventive step (Article 56 EPC).

1.4 The subject-matter of claim 1 thus involves an inventive step over the documents cited and the arguments presented by the appellant in support of its objection.

1.5 In support of its inventive step objections to claim 6 the appellant has relied solely on the arguments it presented with respect to claim 1. The Board finds that these arguments are also not convincing with respect to claim 6 for the same reasons as apply to claim 1, such that its subject-matter is found to also involve an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. H. A. Patin M. Harrison

Decision electronically authenticated